Rabbit health practices of 202 rabbit owners

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Abstract

Owners often underestimate the management needs of pet rabbits. Determining rabbit owners' health management practices, and where they gain health care information, will facilitate veterinary professionals in providing advice to rabbit owners. Rabbit owners in the United Kingdom (n=202) completed an online questionnaire providing information on health checking, vaccination and parasite control practices. Where owners gain information on rabbit health care was also determined. The majority of owners performed daily health checks of their rabbit's appetite, posterior, skin, faeces, face and behaviour, weekly checks of their coat, monthly checks of teeth and occasional checks of body weight and gums. Most owners had vaccinated their rabbits against Myxomatosis and Rabbit Haemorrhagic Disease but were not using parasite prevention methods. The majority of owners stated that they would respond promptly to seek veterinary assistance in response to inappetance. Owners preferred to obtain health information from veterinary professionals though suggested more information on digestive problems and dental disease would be useful. Greater education of owners on the appropriate frequency of health checking is warranted. Veterinary practices could play an integral role in improving owner knowledge of rabbit health practices via providing leaflets in centres, information on veterinary centre websites and dedicated rabbit clinics.

Keywords: Rabbit, health checks, vaccination, parasite control

Introduction

Rabbits are commonly kept, with an estimated 0.8 to 1.2 million rabbits being kept as pets in the United Kingdom (PFMA, 2016; PDSA, 2015). However, the management of pet rabbits can be complex, and their needs are often underestimated by potential and current owners (Edgar and Mullan, 2011; PDSA, 2015). A number of rabbit health problems are commonly presented in veterinary practice including dental disease, myiasis, gastrointestinal stasis, and skin conditions, e.g. pododermatitis (sore hocks) (Bisdorff and Wall, 2006; Lennox, 2008; Meredith, 2010; Mancinelli et al, 2014; Nielsen et al, 2014).

Early detection of rabbit dental disease often results in successful treatment whilst, if left untended, this can result in a poor prognosis (Crossley, 2003). Previous research has found that the prevalence of dental disease is in the region of 30-40% (Mullan and Main, 2006; Jekl et al, 2008). Owners can monitor for signs of dental disease via weekly checks for tooth abnormalities and other clinical signs such as weight loss, dysphagia, epiphora and ptyalism (Reiter, 2008; RSPCA, 2017a; Harcourt-Brown, 2013). Limited literature is available regarding the frequency of owners carrying out basic dental checks. Rooney et al (2014) state that only 26.3% (324/1232) of owners surveyed checked their rabbit's teeth weekly, with 11.5% (142/1232) of owners never checking their rabbit's teeth. Similarly Mullan and Main (2006) found that only 20% (6/30) of the owners surveyed were aware of their rabbit's dental disease. Amongst the multifactorial aetiology, diet is likely to play an important role in the development of dental disease, however

rabbit owners may have a limited knowledge of their pet's dietary requirements (Edgar and Mullan, 2011; Meredith et al, 2015).

Gastrointestinal stasis is a common condition in pet rabbits with 25% of rabbits (96/382) experiencing at least one episode of gastrointestinal stasis within five years of study (Huynh et al, 2014). Early diagnosis along with correct management can improve the prognosis for affected rabbits (Fisher, 2010). Rabbits with no faecal output or ingestion of food for 24 hours must receive treatment from a veterinary surgeon immediately or gastrointestinal stasis may result in death (Meredith, 2010). Without monitoring from owners and familiarity with their rabbit's behaviour, gastrointestinal stasis can go unnoticed.

Myiasis, commonly known as flystrike, is a concern in rabbits especially over summer months. Bisdorff and Wall (2006) reported that 94.5% of practices surveyed (207/219) in South-west England and Wales treated at least one case of myiasis between May and September 2005, with 13.3% of practices reporting death in most diagnosed rabbits. Dental disease and obesity can contribute to the likelihood of myiasis due to accumulation of caecotrophs around the perineum and attraction of flies (Cousquer, 2006). Early detection of myiasis is vital. Basic hygiene and twice daily checks of a rabbit's perineum allows detection and improves prognosis (Cousquer, 2006; Druce, 2015).

Rabbits are susceptible to intestinal parasites including roundworms, tapeworms and protozoa such as *Encephalitozoon cuniculi* (Harcourt-Brown and Holloway, 2003; Cousquer, 2008). Whilst research on ectoparasitic incidence and owner management practices in rabbits is limited,

domestic rabbits can be infected by both the European rabbit flea, *Spillopsyllus cuniculi* (Meredith, 2006), and the cat flea, *Ctenocephalidis felis* (Scarff, 2003). Rabbits are also commonly presented to veterinary clinicians with skin complaints (Nielsen et al, 2014), of which the most common cause is parasites (White et al, 2002).

Myxomatosis and Rabbit Haemorrhagic Disease are viral diseases fatal to rabbits but preventable with yearly vaccination (Davies, 2010; Spibey et al, 2012). Previous studies have reported between 48–70% of rabbits as being vaccinated against Myxomatosis and Rabbit Haemorrhagic Disease (Mullan and Main, 2006; Rooney et al, 2014). However, the PDSA (2015) reported that 50% of rabbits never had primary course vaccinations and 57% of rabbits lacked regular boosters, most commonly because owners were unaware that rabbits required yearly boosters.

All these conditions are preventable if owners practice appropriate health monitoring and management practices. The RSPCA advise daily general health checking of rabbits' eyes, nose, coat, appetite, behaviour and defecation. They also advise more thorough checks each week, alongside weekly checks of teeth condition and weight (RSPCA, 2017a). Twice-daily checking of the rabbit's posterior is suggested to avoid myiasis (Cousquer, 2006; Druce, 2015). However, information on rabbit owners' health checking and health management practices is currently lacking in the literature. Determining owners' health management practices, as well as documenting where owners gain rabbit health care information, will facilitate veterinary professionals in providing care and advice to rabbit owners. The primary objective of this study is to determine the health management practices of rabbit owners via exploring frequency and scope of health checks performed on rabbits by their owners, vaccination and parasite control

practices and owner response to inappetance. A further objective is to determine where owners gain their health care information.

Materials and Methods:

Participant recruitment:

An open-access online questionnaire was designed in SurveyMonkey™ and promoted on the social media website Facebook™ and online rabbit forums. Posters promoting the questionnaire were also distributed to universities, pet stores and veterinary practices in the United Kingdom. The questionnaire was available online between 1st and 23rd December 2015. Participants were required to own a rabbit, be living in the United Kingdom and be 18 years or over to complete the questionnaire. No identifying personal data were collected, and participants were reassured that all responses were voluntary, data remained anonymous, and all information collected was held securely. Participants also provided informed consent.

Questionnaire Design:

A mixed methods approach was applied to survey the management practices of rabbit owners. In addition to demographic information, such as sex, age and location, the questionnaire consisted of five sections on the frequency and scope of health checking, vaccination, parasite control practices, response to inappetance, and where owners gain their health care information. In addition to gathering information on performance of health checks, vaccinations and parasite control, and whether participants had discussed their rabbit's health care with veterinary staff, the reasons affecting performance of these factors were considered. The survey comprised 20 questions, including both open and close-ended questions and Likert scales to allow participants

to rank the importance of the key themes surveyed, as well as encouraging owners to provide rationales for the management practices they employed (Salmons, 2016). The study abided by the guidelines of the Institutional Research Ethics Committee.

The questions on health checking encompassed all health checks that a regular owner may feasibly perform (e.g. teeth, gums, weight, coat, posterior, skin, face, appetite) (RSPCA, 2017a). A seven point Likert-style scale was used to assess how frequently health checking was performed (never, occasionally, monthly, once a week, more than once a week, daily, more than once daily). Potential factors affecting whether health checks were performed were assessed via selection of statements relating to the perceived necessity of health checking, memory, confidence and time. Myxomatosis and Rabbit Haemorrhagic Disease were considered as the main vaccinations which rabbits should receive. Parasite control in terms of flea and worming treatments was addressed. Participants were asked whether they were up to date with vaccinations and parasite control, with selection of statements for the reasons for their answer, such as expense, necessity and veterinary advice. Responses to inappetance in rabbits were also assessed. These were scored via selection of statements pertaining to owner responses to inappetance. Respondents also completed an open question to allow them to explain their reasoning for their response to their rabbit's inappetance. Where owners gain health care knowledge and what further information they felt would be useful was also gathered via selection of statements. Respondents were also provided with an open question to allow them to explain their choice for their source of rabbit health care information.

Data Analysis:

Data were analysed using descriptive statistics. All statistical analysis was performed using Microsoft Excel (Microsoft Inc. 2013).

Results:

Respondent profile:

Two hundred and two British participants took part in this study, however not all participants completed all items on the questionnaire. The majority of participants were from England (n=187; 92.6%). Of the respondents, 92.6% (n=187) were female, 6.93% (n=14) were male and one participant did not respond. Every age category was represented but not equally. Thirty-two point seven percent (n=66) of participants were 18-25, 37.6% (n=76) of participants were 26-39, 24.8% (n=50) of participants were 40-55 and 3.5% (n=7) of participants were 56-70.

Health Checks:

Whilst the majority of rabbit owners performed some form of general health checking (Table 1), 1.5-14.9% of owners never performed the specific checks. In particular, a relatively large proportion of owners (n=29; 14.9%) never checked their rabbit's gums. Rabbit owners showed variation in the frequency of different aspects of health checking. The majority of owners performed daily health checks of their rabbit's appetite (n=74; 37.8%), posterior (n=71; 36.4%), skin (n=62; 31.5%), faeces (n=74; 37.9%), face (n=76; 39.0%) and behaviour (n=67; 34.2%), whilst the majority of respondents checked the coat once a week (n=63; 32.1%), the teeth monthly (n=63; 32.0%), weight monthly (n=70; 35.7%) or occasionally (n=72; 36.7%), and the gums occasionally (n=52; 26.8%) (Table 1). Health checks most commonly occurred due to a perceived sense of duty (n=106; 52.7%) and due to owners reporting that they felt happier having

checked their rabbit (n=61; 30.3%). A small proportion of owners stated that they felt more confident leaving health checks to veterinary professionals (n=11; 5.5%), or that they did not perform specific checks as they believed that they would notice if something was wrong during routine handling (n=11; 5.5%).

Table 1: Frequency of health checks performed on rabbits by their owners. Data are provided as frequencies and percentages of total respondents.

Frequency of health checks	Teeth	Weight	Coat	Appetite	Posterior	Faeces	Gums	Face (e.g. eyes, nose, mouth	Behaviour (e.g. twitching, pain, weakness)	Skin
Never	16 (8.1%)	12 (6.1%)	3 (1.5%)	3 (1.5%)	5 (2.6%)	5 (2.6%)	29 (14.9%)	5 (2.6%)	5 (2.6%)	5 (2.5%)
Occasionally	49 (24.9%)	72 (36.7%)	14 (7.1%)	2 (1.0%)	10 (5.1%)	4 (2.1%)	52 (26.8%)	7 (3.6%)	9 (4.6%)	18 (9.1%)
Monthly	63 (32.0%)	70 (35.7%)	22 (11.2%)	2 (1.0%)	5 (2.6%)	2 (1.0%)	34 (17.5%)	7 (3.6%)	2 (1.0%)	11 (5.6%)
Once a week	50 (25.4%)	29 (14.8%)	63 (32.1%)	13 (6.6%)	31 (15.9%)	10 (5.1%)	45 (23.2%)	29 (14.9%)	15 (7.7%)	46 (23.4%)
More than once a week	7 (3.6%)	7 (3.6%)	39 (19.9%)	39 (19.9%)	54 (27.7%)	42 (21.5%)	16 (8.2%)	41 (21.0%)	38 (19.4%)	40 (20.3%)
Daily	10 (5.1%)	5 (2.6%)	49 (25.0%)	74 (37.8%)	71 (36.4%)	74 (37.9%)	16 (8.2%)	76 (39.0%)	67 (34.2%)	62 (31.5%)
More than once daily	2 (1.0%)	1 (0.5%)	6 (3.1%)	63 (32.1%)	19 (9.7%)	58 (29.7%)	2 (1.0%)	30 (15.4%)	60 (30.6%)	15 (7.6%)
Total	197	196	196	196	195	195	194	195	196	197

Response to inappetance:

The majority of owners would take their rabbit to the veterinary practice as soon as possible in response to inappetance (n=149; 74.1%). Fourteen point nine percent of participants (n=30) would try to encourage eating for 24 hours before going to the veterinary practice. Other

responses involved such as encouraging eating through provision of favourite foods, syringe-feeding, or attempting such measures with subsequent referral to a veterinary surgeon after 30 minutes to a few hours. The reasoning for the owners' response to inappetance was also explored via an open question. Of those owners who took their rabbit to the vet, similar themes emerged relating to recognition of the severity of inappetence for rabbits, as well as concerns regarding gastrointestinal stasis and the rapid deterioration of rabbit health. For those owners who wanted to try to encourage eating for 24hrs before going to the veterinary practice, reasons tended to pertain to wanting to be sure that there was a problem before visiting the vets and concerns that inappetance may be due to fussiness.

Vaccination practices:

The majority of owners vaccinated their rabbits against both Myxomatosis (n=166; 82.2%) and Rabbit Haemorrhagic Disease (n=162; 80.2%). The main reason offered for this was that owners wanted to protect their rabbits from these diseases (Myxomatosis: n=139; 69.8%; Rabbit Haemorrhagic Disease: n=134; 67.3%). Considering only the cases where owners had not vaccinated their rabbits, whilst varying reasons were given, the most common explanation was that it did not seem necessary (Myxomatosis: n=10; 35.7%; Rabbit Haemorrhagic Disease: n=10; 34.5%).

Parasite control practices:

The majority of owners (n=158; 79.8%) were not using flea control treatments upon their rabbits. The predominant reasons for this were that owners felt it was necessary only if the rabbit had

evidence of fleas being present (n=74; 36.8%) or felt that it was not necessary (n=40; 19.9%). Only 14.9% (n=30) of owners stated that they wanted to protect their rabbit from fleas. Similarly the majority of owners (n=130; 64.7%) were not using worming control treatments upon their rabbits. The main reasons for this were due to owners only using control methods when there was evidence of worms being present (n=55; 27.5%) or following veterinary advice on worming treatment (n=45; 22.5%). Only 21.5% (n=43) of owners stated that they wanted to protect their rabbits against worms.

Gaining health care information

The majority of respondents had discussed their rabbit's health care with a veterinary professional (n=181; 89.6%). Whilst varying reasons for this were given, the predominant reason was that owners wanted to know more about rabbit health care (n=133; 68.9%). Of those respondents who had never discussed their rabbit's health care with veterinary staff (n=21; 10.4%), common explanations were that they felt they were already knowledgeable about rabbit health care (n=11; 52.4%) or that they do not take their rabbit to a veterinary practice (n=4; 19.0%). The largest proportion of owners (n=90; 44.6%) preferred to obtain information on rabbit health care from their veterinary practice, with the internet being the second most popular choice (n=77; 38.1%). Other reported sources of information included such as books/journals (n=8; 4.0%) and family/friends (n=6; 3.0%). The reasoning for the owners' choice of their source of rabbit health care information was also explored via an open question. Of those owners who preferred to obtain information from their veterinary practice this was primarily due to the perceived quality, reliability and accuracy of information, whilst for those owners who preferred to use the internet, reasons generally related to quantity, accessibility and convenience of

information. Respondents suggested that they would like to see more information available to owners about digestive problems (n=66; 32.7%) and dental disease (n=50; 24.8%). A lesser proportion of respondents suggested that more information about poisons (n=22; 10.9%), myiasis/flystrike (n=21; 10.4%), weight management (n=21; 10.4%) parasite prevention (n=12; 5.9%) and vaccinations (n=10; 5.0%) would be of value (Figure 1).

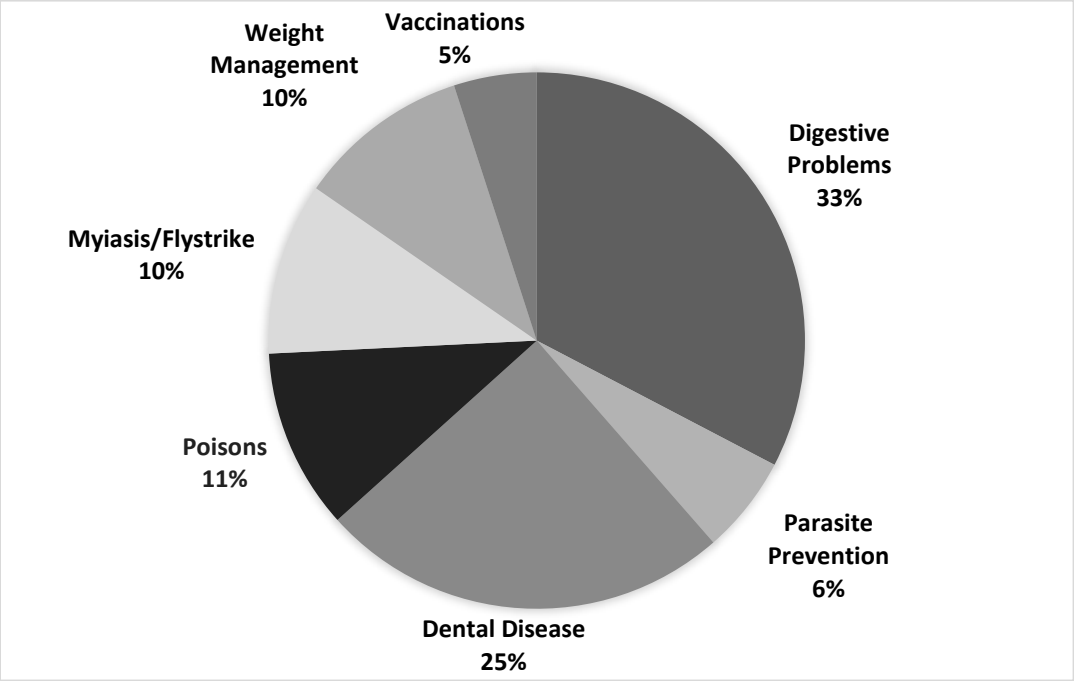

Figure 1: The proportion of respondents who would like more information available to owners about specific aspects of rabbit health.

Discussion:

Health checking is important to allow early detection of disease and maintain health (RSPCA, 2017a). The findings of this study suggest that whilst most owners performed some form of health checking, often due to a sense of duty or due to feeling happier having performed these checks, these were not always carried out frequently enough. The RSPCA advise daily health

checking of rabbits' ocular, nasal and coat condition, as well as of their appetite, behaviour and defecation, with weekly checks of teeth condition and weight (RSPCA, 2017a). Thirty to forty percent of owners performed daily health checks of appetite, the skin, posterior, faeces, face and behaviour, however the teeth, weight and gums tended to be checked more infrequently at intervals ranging from monthly to only occasionally. The large number of owners who are performing infrequent health checks is a concern which has the potential to impact on disease detection and treatment, as well as rabbit welfare.

Dental disease is a widely recognised condition in rabbits, with recommendations for owners to check rabbits' teeth weekly (RSPCA, 2017a). Sixty-five percent of owners checked their rabbit's teeth less than weekly, with 8.1% never carrying out checks. These results are similar to those reported by Rooney et al (2014), who found 66.5% of owners to be checking teeth less than weekly and 11.5% never checking. Other symptoms of dental disease, such as weight loss and decreased appetite, were also infrequently checked. It is unclear whether this indicates a lack of owner awareness about the rapid growth of rabbits' teeth, or about the debilitating effects of dental disease on rabbits such as pain, anorexia, facial swellings and mucosal trauma (Lennox, 2008; Reiter, 2008). Very few owners engaged in frequent checks of their rabbit's gums meaning that issues such as dehydration may not be noted (Varga, 2013).

Checks of the rabbit's posterior are important in mitigating myiasis with twice-daily checks being advised (Cousquer, 2006). It is concerning that many owners are performing these checks at relatively infrequent intervals. This may be due to owners underestimating the severity and

rapid development of the disease, a possible explanation for the high prevalence of cases seen in veterinary practice (Bisdorff and Wall, 2006).

A rabbit's appetite and faecal output should be monitored daily as it can give an indication of gastrointestinal stasis (Meredith, 2010). With 30.1% of owners checking appetite and 32.3% of owners checking their rabbit's faeces less than daily, this raises concerns that gastrointestinal stasis may go unnoticed by many owners. Whilst the majority of owners were aware of the severity of inappetance in rabbits and stated that they would take their rabbit to the veterinary practice as soon as possible in response to inappetance, this is only feasible if changes in appetite are actually noted. Whilst it is promising that the majority of owners seemed aware of the concerns relating to inappetance in rabbits, such as gastrointestinal stasis, the prognosis for gastrointestinal stasis could be improved by better monitoring of appetite and faeces by owners.

The majority of owners vaccinated their rabbits against Myxomatosis (82.2%) and Rabbit Haemorrhagic Disease (80.2%). These results favourably compare with those reported by past work (Rooney et al, 2014 (70.8%; 888/1254); Mullan and Main, 2006 (48.0%; 49/102). The high numbers of owners who are aware of the need to protect their rabbits from these diseases suggests that the increased promotion of the need for vaccinations by welfare charities and veterinary centres over recent years (e.g. RSPCA, 2017b; Vets4Pets, n.d) has been effective.

The vast majority of owners did not use flea (79.8%) or worming (64.7%) control treatments upon their rabbits. This was predominantly due to owners only viewing this as necessary if there was evidence of parasites being present. Currently the RWAF and RSPCA do not recommend routine preventative parasite control for rabbits (RWAF, 2013; RSPCA, 2017c). Whilst this

advice may change in the future if the prevalence of rabbit parasitic infection, such as *E. cuniculi,* increases, currently owner parasite control practices appear to reflect existing welfare practice guidance.

Considering these findings as a whole, whilst owners seem generally well educated on the benefits of vaccinations and to be following recommended guidance regarding parasite control, greater education of owners on the appropriate frequency of health checking is warranted. The majority of owners wanted to know more about rabbit health care (68.9%), were willing to discuss their rabbit's health care with veterinary professionals (89.6%) and preferred to get information from their practice about rabbit health care (44.6%). In addition, where owners got information from their veterinary practice they tended to do so due to the belief that they received reliable and accurate information. This all suggests that owners are likely to be receptive to education on rabbit health care from their practice. This highlights the role that veterinary professionals can play in improving owner knowledge of rabbit health practices. This finding is supported by that of Welch et al (2017) who also found that a large proportion of respondents (74.7%; 2159/2890) gained rabbit health care information from their veterinarians. Greater provision of information and advice to owners on rabbit health checking would be beneficial. More information on common issues such as digestive problems and dental disease would also be appreciated by owners. This information could be disseminated via leaflets in centres, veterinary centre websites and dedicated rabbit clinics. Edgar and Mullan (2011) found that the majority of owners acquired information prior to buying a rabbit through leaflets, pet shops and books. In addition to purchase from pet shops, many rabbits in the United Kingdom are also acquired through rescue centres (Edgar and Mullan, 2011; Oxley et al, 2015). Veterinary

practices could therefore also work with pet shops and rescue centres on providing guidance on health care at point of purchase, whilst promoting the use of the practice as an educational source. It is also important that veterinary practice staff ensure that their rabbit knowledge and provision is up to date. Some veterinary surgeons and nurses may lack experience with rabbit health care (RWAF, n.d) and handling (Sayers, 2010). Veterinary professionals lacking knowledge and experience with rabbits should ensure that they engage in continuing professional development in order to be able to confidently advise owners on health care and help to maximize rabbit welfare.

In conclusion, these results highlight the need for further education of rabbit owners on the importance of health checking and the role that veterinary centres can play in facilitating this. Whilst the study has several limitations, such as not distinguishing between the use of physical and/or visual health checks by rabbit owners, and the potential issues with the online sampling method and self-selection bias (Wright, 2005) such that the results may not be generalizable to the British rabbit owing population, this is the first study to our knowledge to determine the health management practices of rabbit owners in the United Kingdom. Further research is needed to determine how different frequencies of health checking may impact upon rabbit health, as well as to identify how rabbit owners perform different aspects of health checking, as visual and physical assessments may differ in terms of their efficacy when checking different areas of the rabbit, as well as in the quality of rabbit health information obtained. In addition, further study investigating the guidance that is provided by veterinary professionals to rabbit owners about rabbit health checking would be of value.

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